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Integrating Ecosystem Management Approaches Into Federal Fishery Management Through The Magnuson-Stevens Fishery Conservation And Management Act

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INTEGRATING ECOSYSTEM MANAGEMENT APPROACHES INTO FEDERAL FISHERY MANAGEMENT THROUGH THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

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I. INTRODUCTION

The Magnuson-Stevens Fishery Conservation and Management Act ("Magnuson-Stevens Act") provides the statutory framework for the management of federal fisheries in the United States. Critics of fishery management law have suggested that the Magnuson-Stevens Act needs to be revised to allow for a more ecosystem-based management approach. Although a variety of other statutes can be applied to provide various degrees of overlapping protections for marine ecosystems,[1] the purpose of this paper is to explore the extent to which the Magnuson-Stevens Act on its own provides a statutory basis for managing our fisheries using ecosystem principles. The article begins by defining what is meant by "ecosystem management," then reviews the development of law, focusing

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1. For example, the Endangered Species Act, the Marine Mammal Protection Act, the Migratory Bird Treaty Act, the Coastal Zone Management Act, the Oil Pollution Act, NEPA, and the Clean Water Act all provide varying degrees of overlapping protections for Marine ecosystems. Considering the combined effects of these laws, we may be doing more for ecosystems than is immediately apparent by examining just one aspect of Federal management. However, the fact that different management agencies representing different constituent groups with different needs and priorities retain implementation authority over different statutes can undermine the effectiveness of applying these statutes to holistically consider and promote ecosystem protections. For a discussion of what we mean by the term "ecosystem management," *see infra*, notes 2–9.

particularly on the evolution of central themes such as overfishing, optimum yield, bycatch, and habitat. This is followed by an examination of how NMFS has interpreted key statutory provisions and assessment of the extent to which current fishery management law and regulations allow for, and encourage, ecosystem-based management. In conclusion this article explores the extent to which statutory changes may be needed to allow for a more ecosystem-based management approach.

II. OVERVIEW OF ECOSYSTEM CONCEPTS

A key challenge confronting efforts to implement and assess "ecosystem management" measures is the difficulty in defining core terms. "Ecosystem management" can have different meanings to different people. While there is a general consensus that ecological issues should be the foundation of ecosystem management, some commentators believe that social and economic issues also play a role.[2] The "ecological" approach to fishery management would look at the interactions between organisms and their environment and the effects of those interactions on the distribution and abundance of organisms.[3] Yet ecosystem management might also encompass institutional, informational, and administrative concepts, such as stakeholder involvement in decision-making.[4]

In 1998, the Ecosystem Principles Advisory Panel, a Congressionally-mandated national advisory panel, completed a report on the application of ecosystem principles in fishery management activities.[5] The Advisory Panel's report identified the goal of ecosystem-based management as "to maintain ecosystem health and stability," describing ecosystem health as, "the capability of an ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition,

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2. *See* Sheila Lynch, *The Federal Advisory Committee Act: An Obstacle to Ecosystem Management by Federal Agencies?* 71 WASH. L. REV. 431, 432–433 (1996). *See also*, Harry N. Scheiber, *The Ecosystem Approach: New Departures for Land and Water: From Science to Law to Politics: An Historical View of the Ecosystem Idea and Its Effect on Resource Management*, 24 ECOLOGY L. Q. 631, 631–632 (1997).

3. *See* Richard Condrey and Janaka deSilva, *An Ecological Approach to the Bycatch Issue: A Necessity for the Successful Identification of Hot Spots and Potential Solutions*, SUSTAINABLE FISHERIES FOR THE 21ST CENTURY? A CRITICAL EXAMINATION OF ISSUES ASSOCIATED WITH IMPLEMENTING THE SUSTAINABLE FISHERIES ACT, 86 (J. Speir, ed., 1998).

4. *See* Scheiber, *supra* note 3, at 631–32.

5. *See* Ecosystem Principles Advisory Panel, ECOSYSTEM-BASED FISHERY MANAGEMENT, A REPORT TO CONGRESS (Nov. 15, 1998). In 1996, Congress directed the Secretary of Commerce to convene an Ecosystems Principles Advisory Panel to develop recommendations to expand the application of ecosystem principles to fishery conservation and management activities. *See* Sustainable Fisheries Act, 16 U.S.C. § 1801 (1996).

diversity and functional composition comparable to that of the natural habitat of the region."[6] The panel's report conceptualized ecosystem-based management as an approach that would require recognition and consideration of the complex interactions and interdependencies in a fishery, and that would allow for the maintenance of such natural complexities.

The panel concluded that in order to manage for ecosystems, managers must both understand the basic characteristics of ecosystems, and develop an ability to manage activities that affect ecosystems in a manner consistently with goals. Pursuant to an ecosystem-based approach, managers would "consider all interactions that a target fish stock has with predators, competitors, and prey species; the effects of weather and climate on fisheries biology and ecology; the complex interactions between fishes and their habitat; and the effects of fishing on fish stocks and their habitat."[7] The report identified eight principles for understanding ecosystems and six key policies for promoting ecosystem-based management. The eight principles include:

1. The ability to predict ecosystem behavior is limited;
2. Ecosystems have real thresholds and limits which, when exceeded, can effect major system restructuring;
3. Once thresholds and limits have been exceeded, changes can be irreversible;
4. Diversity is important to ecosystem functioning;
5. Multiple scales interact within and among ecosystems;
6. Components of ecosystems are linked;
7. Ecosystem boundaries are open;
8. Ecosystems change with time.[8]

The key concepts embodied in these principles include recognition of our limited understanding of and ability to predict ecosystem functioning, the importance of diversity, the complexity of interactions and downstream impacts, and the recognition that ecosystems are in flux.

The policies, which are based on the overriding concepts of ecosystem exhaustibility, uncertainty, and human interaction, include:

1. Change the burden of proof;
2. Apply the precautionary approach;
3. Purchase "insurance" against unforseen, adverse ecosystem impacts;

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6. Ecosystem Principles Advisory Panel, *supra* note 5, at 1, 18.
7. *Id.* at 1.
8. *Id.*

4. Learn from management experiences;
5. Make local incentives compatible with global goals; and,
6. Promote participation, fairness, and equity in policy and management.[9]

This paper will use these principles and policies as measuring posts to guide an assessment of our current ability to manage for ecosystems under existing statutory authority. The following discussion will highlight areas of the law that deal with how uncertainty is responded to, how diversity is valued, how well stakeholder participation is provided for, and how well multi-faceted linkages and downstream interactions that can be triggered by management measures are considered.

III. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT: EVOLUTION OF FISH MANAGEMENT LAW

In an effort to assess the capacity of the current legal structure to accommodate or promote ecosystem-based management, it is instructive to review the origins and development of fishery management laws in the United States. In the past twenty-five years, national fishery management law has evolved from a law designed to oust foreign fishing effort and replace it with domestic effort, into a law that is substantially more focused on making the fishery resource a sustainable component of its ecosystem.

A. The FCMA: First Fish Law in United States

Historically, there was widespread belief that marine fisheries resources were almost inexhaustible and in no need of regulation.[10] Prior to 1976, there was little federal management of United States fisheries. States had management authority within their territorial waters, but there was no comprehensive management regime governing U.S. waters beyond territorial waters.[11] The inadequacies of this approach became evident in the 1960s and 1970s, when, fueled by technological advances, foreign fleets began high-volume, intense fishing efforts off the U.S. coasts. Local fishermen began noticing decreasing yields. Stocks were becoming

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9. *Id.*

10. *See* Gary C. Matlock, *Management History, Management Future*, in SUSTAINABLE FISHERIES FOR THE 21ST CENTURY? A CRITICAL EXAMINATION OF ISSUES ASSOCIATED WITH IMPLEMENTING THE SUSTAINABLE FISHERIES ACT, 9 (J. Speir, ed., 1998).

11. *See* J. Winn, Comment, *Alaska v. F/V Baranof: State Regulation Beyond the Territorial Sea After the Magnuson Act*, 13 B.C. ENVTL. AFF. L. REV. 281, 281–284 (Winter 1986).

depleted.[12] In 1976, with the idea that domestic fishermen would manage their harvests more responsibly than foreign fishermen, Congress passed the Fishery Conservation and Management Act (FCMA), the goal of which was to eliminate foreign fishing in U.S. waters and replace that effort with domestic fishing.[13]

1. Structure of the FCMA

The FCMA established the basic structure for fishery management that continues to be in use today: a 200 mile "Fishery Conservation Zone" within which the United States would exercise exclusive fishery management authority;[14] eight regional fishery management councils to develop fishery management plans (FMPs) and recommend fishery conservation and management measures;[15] seven national standards with which the FMPs had to conform;[16] and five specific types of provisions that FMPs

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12. *See* JOHN P. WISE, FEDERAL CONSERVATION AND MANAGEMENT OF MARINE FISHERIES IN THE UNITED STATES, 18–27 (Center for Marine Conservation, 1991). *See also* Matlock, *supra* note 10, at 9–11.

13. In the FCMA, Congress articulated its findings that "international fishery agreements have not been effective in preventing or terminating the overfishing of these valuable fishery resources;" that "if placed under sound management . . . the fisheries can be conserved and maintained so as to provide optimum yields on a continuing basis;" and that "a *national* program . . . is necessary to prevent overfishing, rebuild overfished stocks," and develop fisheries that were underutilized by the United States. Fishery Conservation and Management Act of 1976, 16 U.S.C. § 1801 (a)(4)–(7)(1976).

14. Congress enacted the FCMA prior to President Reagan's establishment of the U.S. Economic Zone. *See* Proclamation No. 5030, 48 Fed. Reg. 10,605 (1983). Pursuant to President Reagan's proclamation, the "exclusive economic zone" (EEZ) extends from the "territorial sea" to a line 200 nm from the baseline (i.e., shore). Given that the territorial sea extends to12 nautical miles (n.m.) from the baseline, for most purposes, the EEZ begins approximately 12 n.m. offshore. *See* Proclamation No. 5928, 54 Fed. Reg. 777 (1988), *reprinted in* 43 U.S.C. § 1331 *note*. Congress later changed the language of the FCMA to apply fisheries within the EEZ rather than in the Fishery Conservation Zone, but at the same time changed the boundaries of the EEZ for purposes of fish management. The Magnuson-Stevens Act now states that "[f]or purposes of applying this Act, the inner boundary of [the exclusive economic zone] is a line coterminous with the seaward boundary of each of the coastal states." Magnuson-Stevens Act, section(3)(11). The seaward boundaries of the states extend to 3 or 9 nm, depending on the State. Thus, for purposes of the Magnuson-Stevens Act, the EEZ is larger (3/9–200nm) than it is for other purposes (12–200nm).

15. *See* 16 U.S.C. § 1852 (a)(1)(A–H). New England Council, Mid-Atlantic Council, South Atlantic Council, Caribbean Council, Gulf Council, Pacific Council, North Pacific Council, and Western Pacific Council. *See id.* § 1851(a)(1–7).

16. *See id.* The seven original national standards required that FMPs: (1) prevent overfishing, while achieving optimum yield (OY); (2) be based on best scientific information available; (3) manage stocks as a unit throughout their range; (4) not discriminate between residents of States, and ensure that allocations be fair and equitable; (5) promote

must include.[17] The FCMA charged the Secretary of Commerce with responsibility for reviewing council-recommended plans and approving and implementing plans that comply with the nationals standards and other applicable law.[18] The Secretary of Commerce has delegated much of the responsibility for implementing fishery management law to the National Marine Fisheries Service (NMFS).

As the statute has evolved over the years, Congress has maintained its original structure whereby the Councils recommend management plans in conformance with statutory parameters that reflect Congressional priorities. While the structure of the law has remained constant, the polices and priorities it advances have changed significantly. The FCMA placed greater emphasis on utilization of the resource than on ecosystems and conservation. The policies articulated in its national standards as well as its treatment of other key issues highlight the fact that it was not designed to be a conservation statute.

2. Overfishing and Optimum Yield

The FCMA's first national standard incorporated two central concepts of fishery management: prevention of overfishing, and the pursuit of optimum yield (OY). Although prevention of overfishing was a fundamental goal of fishery management, the FCMA did not define the term "overfishing." Rather, each regional council had discretion to define overfishing in the fisheries under its jurisdiction. The FCMA did, on the other hand, define OY (i.e., the level or rate of catch that an FMP's management measures are designed to achieve).[19] The FCMA directed that to calculate the OY, one must first calculate the "maximum sustainable yield" (MSY), a scientific calculation of the largest long-term average catch that can be taken from a stock or stock complex under prevailing ecological conditions.[20] To determine OY, the Councils were to start with MSY, then "modify" that level to account for "any relevant economic, social, or

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efficiency in the utilization of the resource; (6) take into account variations among and contingencies in fisheries; and, (7) minimize costs, and avoid unnecessary duplication. *Id.*

17. *See id.* § 1853(a)(1)–(5). The FCMA also specified that FMPs must: (1) contain necessary and appropriate conservation and management measures; (2) include a description of the fishery; (3) assess and specify maximum sustainable yield (MSY) and OY from the fishery; (4) assess and specify the capacity of US harvesters and processors; and (5) specify data to be submitted to the Secretary. *Id.*

18. *See* 16 U.S.C. § 1854 (1976).

19. *See id.* § 1802 (18).

20. *Id.* § 1802 (18)(B).

ecological factor."[21] Thus it was possible to calculate a level of "optimum" yield that was greater than the level of "sustainable" yield.

3. Efficiency in Utilization

The FCMA's fifth national standard is another indicator of the early statute's emphasis on utilization of the resource. The standard required that FMPs "promote efficiency in the utilization" of the resource.[22] As applied, the promotion of efficiency in utilization has contributed to the development and utilization of technologies that enable fewer fishermen and fewer vessels to harvest more fish in less time. Many fisheries now face a problem of excess capacity, where too many fishermen compete for too few fish. Excess capacity can negatively affect coastal communities dependent on the fishing industry, safe fishing practices, and the ability to fish in a clean, slow manner. This promotion of efficiency was probably inconsistent with the ecosystem-management principles of following the precautionary approach, and shifting the burden of proof to protect the resource.

4. Stakeholder Involvement

To a certain extent, the council structure of the FCMA was ahead of its time in terms of providing for stakeholder involvement, particularly in light of the goals it was designed to achieve. The FCMA set forth requirements for Council membership to ensure that the fishing industry was well represented on the Councils and participated in the design of fishery management measures. The FCMA specified which states belonged to which Councils, and established criteria for Council membership.[23] Council members were to be appointed by the Secretary from lists submitted by the governors of each Council's constituent states. Council members were to be "knowledgeable or experienced with regard to the management, conservation, or recreational or commercial harvest, of the fishery resources of the geographical area concerned."[24] Geographically, Congress gave the councils the authority to prepare joint management plans for fisheries that extend beyond the geographical scope of one council.[25]

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21. *Id.*
22. *Id.* § 1851(a)(5).
23. *See id.* § 1852
24. *Id.* § 1852 (b)(2)(A).
25. *See id.* § 1854 (f).

Alternatively, NMFS could designate one council to prepare a management plan for the fishery's entire range.[26]

Looking at the council provisions from an ecosystem perspective, there is a notable absence of representation of perspectives other than those of fish harvesters. It is unclear whether the language of the FCMA would have allowed the appointment of a marine mammal expert or a seabird expert as a person knowledgeable about the conservation of the fishery resource. Whether it was legally possible or not, it certainly was not legally mandated that such perspectives be included.[27]

5. Habitat

The interrelationship between fishing, fish stocks, and habitat is an important consideration in ecosystem management. Yet the original fish management statute did not require any consideration of that interrelationship.

B. Early Rounds of Amendments, "The Magnuson Act"

Between 1976 and 1996, the FCMA was amended several times. One of the early amendments changed the name of the statute to the Magnuson Fishery Conservation and Management Act.[28] Most of the early rounds of amendments dealt with foreign fishing levels, observer coverage for the foreign fleet, and technical aspects of the council system. By the late 1980s, foreign fishing had been eliminated, but it had been replaced by new, high-volume American fleets.[29] The same problems of resource overexploitation were occurring under U.S. management as had occurred under foreign fishing. It was at this point that Congress began moving towards a more conservation-oriented approach in its fishery management laws. The amendments of the early 1990s laid the foundation for developing a more ecosystem-friendly approach to fish management that recog-

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26. Interestingly, the FCMA excluded tuna from the definition of fish, and therefore did not provide for management of tuna under the Act. In the definition of "fish" the FCMA clearly excluded highly migratory species such as tuna from coverage. *See id.* § 1802 (7), (14). This exception has been described as "a concession to U.S. distant-water tuna interests, who wanted continued access to tuna in other countries' 200-mile zones." *See* WISE *supra* note 12, at 53.

27. *See* WISE *supra* note 12, at 10.

28. *See* Conservation and Enhancement of Salmon and Steelhead Resources, Pub. L. No. 96-561 § 238, 94 Stat. 3300 (1980).

29. *See* WISE, *supra* note 12, at 11.

nized the need for consideration of long-term issues and the importance of information to the design of sound management measures.

1. Long-Term Health

One key change Congress made was to require that FMPs include more protections for the health of fisheries. Whereas the FCMA had included the generalized requirement that FMPs contain necessary and appropriate conservation and management measures, the amendments added language requiring that FMPs contain management measures that would "prevent overfishing and protect, restore and promote the long-term health and stability of the fishery."[30]

2. Information Needs

Congress also added two brand new mandatory FMP components requiring that FMPs and amendments (1) "specify the nature and extent of scientific data which is needed for effective implementation of the plan," and (2) include fishery impact statements, describing effects of the management measures on fishery participants, including fishery participants under other, adjacent councils' jurisdictions.[31]

3. Highly Migratory Species

During these rounds of amendments, Congress added tuna into the definition of "fish."[32] Under earlier versions of the law, tuna had been specifically excluded from management jurisdiction. The councils, even with their expanded jurisdiction to manage cooperatively with each other, would have been challenged to develop a management strategy for fish that migrate all the way across the Atlantic, yet as an important component of the marine ecosystem it makes sense that tuna be considered and managed by the same agency managing the other fisheries. Therefore, Congress also created authority for NMFS to manage highly migratory species through a centralized, transboundary approach.[33]

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30. Fishery Conservation Amendments of 1990, Pub. L. No. 101-627, § 109, 104 Stat. 4447 (1990).

31. Id.

32. *See id.* § 102(a), 104 Stat. 4438 (1990).

33. *See id.* § 110(b), 104 Stat. 4450 (1990).

4. Stakeholder Involvement

During these years, Congress made changes to the criteria and process for appointing council members. The previous requirement, that appointed voting members be "knowledgeable or experienced with regard to the management, conservation, or recreational or commercial harvest, of the fishery resources of the geographical area concerned," was modified. The new criteria required that members must be "knowledgeable regarding the conservation and management, or commercial or recreational harvest," of the relevant fishery resources.[34] In addition, the basis for that knowledge must be "by reason of their occupational or other experience, scientific expertise, or training."[35] The intent behind these changes was to facilitate the appointment of individuals from diverse backgrounds, such as "commercial fishing, sportfishing, environmental organizations, or academic and research institutions."[36]

In addition, Congress required that in developing the lists of nominees, the governors must consult with the recreational and commercial fishing interests in their states and the Secretary must "ensure a fair apportionment, on a rotating or other basis, of the active participants . . . in the fisheries under council jurisdiction."[37] While these changes reflect Congress's growing sensitivity to the power of the Councils and the need for balanced representation among industry sectors, they did not necessarily improve the Council composition with respect to ecosystem considerations. The changes allowed, but did not compel, appointments from interests other than the fishing sector, and to the extent they required balancing, it was only among fishing sectors.

Congress also made the Councils and their advisory panels exempt from the Federal Advisory Committee Act (FACA), which places restrictions on the government's ability to solicit consensus recommendations from stakeholder groups.[38] As current scholars are beginning to recognize, FACA poses a potential obstacle to the type of stakeholder

34. *Id.* § 108 (b), 104 Stat. 4444 (1990).

35. *Id.*

36. S. REP. NO. 414, *reprinted in* 1990 U.S.C.C.A.N. 6290, 6293.

37. An Act to Improve Fishery Conservation and Management, Pub. L. No. 97-453, 96 Stat. 2481, 2484 (1983); *see also* Fisheries Conservation and Management, Pub. L. No. 99-659, § 104, 100 Stat. 3706, 3709 (1986).

38. *See* Federal Advisory Committee Act, Pub. L. No. 92-463, 86 Stat.770, (codified as amended at 5 U.S.C. app. at 1371); Fishery Conservation and Management Improvement, Pub. L. 97-453 § 5, 96 Stat. 2481 (1983).

involvement that ecosystem-based management requires.[39] Fish management councils have been free of this type of obstacle for many years.

5. Habitat

Another key change Congress made during these early rounds of amendments was in the realm of habitat. Noting that many fisheries managed under FMPs are "dependent upon fishery habitat, such as coastal wetlands, estuaries, and inland rivers," Congress added a new requirement that FMPs "include readily available information regarding the significance of habitat to the fishery and assessment of the effects which changes to that habitat may have on the fishery."[40] While this change represented a vast improvement over the previous void of habitat considerations, its focus was limited to how the habitat, or alterations to the habitat, might affect the fish resource, and not how the fishing activities might affect the habitat. In designing these provisions, Congress recognized the limitations of available data relating to habitat, and intended that habitat considerations would not hold up ongoing management of fisheries.[41]

C. 1996 Sustainable Fisheries Act Amendments, "Magnuson-Stevens Act"

Prior to 1990, most conservation organizations had paid little attention to fishery issues.[42] However, in the early and mid-1990s that attitude began to change on a global level. In 1992, an international Conference on Responsible Fishing held in Cancun, Mexico, recommended that the United Nations Food and Agriculture Organization (FAO) develop a Code of Conduct for Responsible Fisheries.[43] Also in 1992, nations attending the

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39. *See generally* Lynch *supra* note 2, at 432–433; Scheiber *supra* note 2.

40. S. REP. NO. 99-67, 99th Cong., 2d Sess. 13, *reprinted in* 1986 U.S.C.C.A.N. 6240, 6253; Pub. L. 99-659 § 105(a), 100 Stat. 3711 (1986).

41. *See* S. REP. NO. 99-67, 99th Cong., 2d Sess. 21, 22, *reprinted in* 1986 U.S.C.C.A.N. 6240, 6261, 6262; Pub. L. 99-659 § 105(a), 100 Stat. 3711 (1986).

42. In 1991, John Wise wrote in a Center for Marine Conservation publication:

> A curious fact is that most conservation organizations have so far been silent on issues involving marine fishing and overfishing, except as they affect protected species. Perhaps the reason for this silence is that conservationists and the public have remained largely unaware of the problems. It is difficult to rouse public sentiment concerning overexploitation of animals that do not lend themselves to appealing photographs. As one longtime worker in fisheries puts it, there is no "Friends of the Haddock."

WISE, *supra* note 12, at 10.

43. *See* Matlock, *supra* note 10 at 10.

Earth Summit in Rio de Janeiro called for new agreements on straddling fish stocks and highly migratory fish stocks, and for use of the precautionary approach, and agreed to promote conservation and management of fisheries resources by vessels fishing on the high seas.[44] In 1995, FAO issued a report concluding "that about 70 percent of the world's commercially important marine fish populations were fully fished, overexploited, deleted, or slowly recovering."[45] That same year, the FAO issued the Code of Conduct for Responsible Fisheries, and in conjunction with Sweden, convened a Technical Consultation on the Precautionary Approach, which recognized that "all fishing activities have environmental impacts, and it is not appropriate to assume these are negligible until proved otherwise."[46] In addition to these concerns growing on an international level, the U.S. Congress was paying increased attention to the importance of having various perspectives represented and balanced in the Council process, as well as to the indirect impacts of management measures, fishing regulations, economic incentives, and advancing technologies on fishing communities, small fishing businesses, and the safety of life at sea.[47]

It was within this context that Congress enacted the Sustainable Fisheries Act of 1996 (SFA). While some of the amendments of the 1980s and early 1990s may have hinted at a move towards more ecosystem-friendly management, the SFA represented a true paradigm shift away from viewing fish as a resource for extraction to fish as a component of a larger ecological system. The SFA dramatically amended the Magnuson Act, changing the name to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), introducing new definitions,[48] national standards,[49] FMP components,[50] and Secretarial responsibilities. The SFA transformed the approach to fishery management and planning by adding requirements pertaining to bycatch, overfishing, essential fish habitat, and fishing communities. Underlying themes in the new require-

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44. *See id.* at 12.

45. *Id.* at 10.

46. *Id.* at 13.

47. *See* S. REP. NO. 276, 104th Cong., 2d Sess., *reprinted in* 1996 U.S.C.C.A.N. 4073.

48. The SFA added 13 new definitions into the Magnuson-Stevens Act to include bycatch, charter fishing, commercial fishing, economic discards, essential fish habitat, fishing community, individual fishing quota, overfishing and overfished, recreational fishing and regulatory discards. *See* Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1802 (West. Supp. 2000).

49. The SFA added National Standards 8,9 and 10, addressing issues relating to fishing communities, bycatch, and safety of life at sea, and modified existing national standard 5, which deals with efficiency. *See id.* § 1851(a)(8)–(10).

50. Through modifications and additions, the SFA resulted in 8 newly articulated mandatory components of FMPs. *See id.* § 1853(a).

ments include: (1) the need to provide information and identify where more information is needed, and (2) the recognition that fishing occurs within a broad ecological, environmental, and socio-economic context and can have far-reaching downstream impacts.

As these new provisions begin to take effect, individually and cumulatively they should improve the ability to manage from an ecosystem perspective by increasing the information available to managers, facilitating consideration of impacts on interrelated aspects of the ecosystem, and improving managers' ability to learn from experience. The following describes in greater detail some of the more significant SFA additions to the Magnuson-Stevens Act.

1. Overfishing and Optimum Yield

The duel mandates of prevention of overfishing while achieving OY have played a central role in fisheries management since the first FCMA. However, prior to the SFA, there was no statutory definition of "overfishing," no requirement that Councils adopt measurable criteria for ascertaining which stocks were overfished or approaching an overfished condition, and no requirement to rebuild overfished fisheries.

The SFA added new definitions for both "overfishing" and "overfished," defining them as "a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the maximum sustainable yield on a continuing basis."[51] It also modified National Standard 1, which previously had required FMPs to contain the conservation and management measures that are necessary and appropriate to "prevent overfishing, and to protect, restore, and promote the long-term health and stability of the fishery."[52] The SFA added a rebuilding requirement by inserting after "to prevent overfishing," the words, "and rebuild overfished stocks."[53] In addition, the SFA added a new statutory requirement for how FMPs are to address overfishing. It mandates that FMPs shall:

> Specify objective and measurable criteria for determining when the fishery to which the plan applies is overfished (with an analysis of how the criteria were determined and the relationship of the criteria to the reproductive potential of stocks of fish in that fishery) and, in the case of a fishery which the Council or Secretary has determined is approaching an overfished condition or is overfished,

51. *Id.* § 1802 (29).
52. *Id.* § 1853(a)(1)(A).
53. *Id.*

> contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery.[54]

This new section builds on the new statutory definition of overfishing by requiring the councils to specify hard line criteria for determining when that definition is met. In addition, it requires that councils take steps to prevent fisheries from reaching those criteria and to rebuild fisheries that have met them.[55]

The new overfishing provisions require NMFS to report annually to Congress and the Councils on the status of regulated fisheries, using the overfishing criteria specified in the FMPs.[56] For any fishery that is overfished, the Council (or the Secretary for HMS species) must develop a rebuilding plan within one year. If a Council fails to do so, the Secretary then must develop the plan within nine months. The SFA requires rebuilding plans to:

> specify a period for ending overfishing and rebuilding the fishery that shall be (i) as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the U.S. participates, and the interaction of the overfished stock of fish within the marine ecosystem; and (ii) not exceed 10 years, except in cases where the biology of the fish, other environmental conditions, or management measures under an international agreement in which the United States participates dictate otherwise.[57]

The SFA also revised the definition for "optimum," as follows:

> The term "optimum" with respect to yield from a fishery means the amount of fish – (a) which will provide the greatest overall benefit to the Nation with particular reference to food production and recreational opportunities **taking into account the protection of marine ecosystems**; (b) is prescribed as such on the basis of the maximum sustainable yield from such fishery, as ~~modified~~ **reduced** by any relevant economic, social, or ecological factor~~;~~**;**

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54. *Id.* § 1853(a)(10).

55. The SFA established an annual requirement for reviewing the status of fisheries and identifying those that are overfished or approaching an overfished condition. For fisheries that are overfished or approaching an overfished condition, the statute sets forth a detailed timeline for correcting the problem. *See id.* § 1854(e).

56. *See id.*

57. *Id.* § 1854(e)(4)(A).

> **and (c) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.**[58]

Previous law had provided that OY was based on MSY, as "modified" to account for social, economic, or ecological concerns.[59] The SFA amendments changed the word "modified" to "reduced," thereby ensuring that OY could never be set above MSY and added requirements to consider the protection of marine ecosystems and to provide for rebuilding overfished fisheries in setting OY.[60]

2. Bycatch

During the development of the SFA, there was general support among fishermen, scientists, conservationists, and managers for measures to reduce bycatch and eliminate waste.[61] However, these groups did not necessarily support the same approach for achieving these goals, or even share a common understanding of the meaning of "bycatch."[62] The first step in developing a bycatch management approach required the development of a definition.[63] Ultimately, the SFA defined, "bycatch" as "fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards [but] does not include fish released alive under a recreational catch and release program."[64]

There were also various perspectives on the best way to design a management approach. One proposal was to require full retention and

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58. 16 U.S.C.A. § 1802(28) (West Supp. 2000).

59. *See id.* § 1802(18).

60. *See id.* § 1802(28).

61. *See* Penelope D. Dalton, *Bycatch Provisions of the Sustainable Fisheries*, in SUSTAINABLE FISHERIES FOR THE 21RST CENTURY? A CRITICAL EXAMINATION OF ISSUES ASSOCIATED WITH IMPLEMENTING THE SUSTAINABLE FISHERIES ACT 79 (J. Speir ed., 1998).

62. *Id.* at 80.

63. The term bycatch refers to fish that one catches while fishing for something else. For example, fishermen targeting yellowfin tuna, a species worth roughly $10 per pound, sometimes catch bluefin tuna, worth roughly $50 per pound, as well. Another example of bycatch could be small fish that are captured in a net with a school of bigger fish that are being targeted. In the second example, the fisherman would be likely to discard the bycatch. In the first example, he would be likely to retain and sell the bycatch. Another issue to consider in defining bycatch was that in a growing number of recreational fisheries, the targeted species is caught, then released. A definition based on the concept of retention would not accommodate the catch and release fisheries. *Id.* at 82–83.

64. See 16 U.S.C. § 1802(2).

utilization of all caught fish, another was to assess the impacts of bycatch and minimize the discard of unusable fish, yet another was to incorporate bycatch considerations into a new national standard on economic efficiency.[65] Ultimately, the SFA added a new national standard and a new mandatory FMP component that together require Councils to collect information to better understand impacts on non-target species, minimize waste, and reduce impacts on non-target species. New National Standard Nine requires that conservation and management measures "shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch."[66] New section 303(a)(11) requires FMPs to:

> establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority – (A) minimize bycatch, and (B) minimize the mortality of bycatch which cannot be avoided.[67]

The new bycatch standard could have been directly at odds with the old law's mandate to promote efficiency in utilization. In many cases, fishermen use a particular type of gear because it is the most efficient in extracting the target species. For mixed stock fisheries, the most efficient gear type probably also results in the greatest amount of bycatch. Requiring fishermen to use gear types that minimize bycatch might be expected to result in less "efficiency" in extracting target catch. Similarly, the most efficient technologies could be those requiring the fewest vessels and employing the fewest crew members, a factor at odds with sustaining participation of coastal communities in the fishing industry.

Although fish caught and released through recreational fisheries were not included in the definition of bycatch, the SFA did require that the mortality of these fish be considered and minimized. It added a requirement for FMPs to assess and address the problem as follows:

> [FMPs shall] assess the type and amount of fish caught and released alive during recreational fishing under catch and release fishery management programs and the mortality of such fish, and include conservation and management measures that, to the extent

65. *See* Dalton *supra* note 61, at 82–83.
66. *See* 16 U.S.C. § 1851(a)(9).
67. *Id.* § 1853(a)(11).

practicable, minimize mortality and ensure the extended survival of such fish.[68]

3. Habitat

Previous law recognized that habitat was an issue interconnected with fish management, however, it did not specifically recognize the importance of habitat to fish, or the desirability of protecting and enhancing important areas of habitat. The SFA radically revised the way FMPs account for and respond to effects on habitat. The SFA created a definition for "essential fish habitat" (EFH), revised the required FMP provisions relating to habitat, established a new national standard on EFH, and imposed new duties on the Secretary. The SFA created the concept of EFH and defined it as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity."[69]

In terms of management, previous law required only that the agency look at "readily available" information on "the significance of habitat to the fishery," and an assessment of how changes to the habitat could affect the fishery.[70] The SFA struck all the old language and replaced it with the following, ushering in a new perspective on the relationship of fisheries to their habitats. The new provisions require that FMPs:

> [D]escribe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary . . . minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat;[71]

Thus, the Councils are required to proactively identify EFH, to consider how fishing activities affect habitat, to minimize fishing impacts to the extent practicable, and then, to provide additional information about the types of other activities that could be changed or undertaken to enhance habitat.

The Secretary's new essential fish habitat duties include establishing guidelines to assist the councils in identifying EFH, assessing adverse impacts on EFH, providing information on ensuring the conservation and enhancement of EFH, and providing a schedule for the amendment of

68. *Id.* § 1853(a)(12).
69. *Id.* § 1802(10).
70. *See supra* note 39.
71. *See* 16 U.S.C. § 1853(a)(7).

FMPs to provide EFH provisions.[72] In addition, the SFA required the Secretary to review Department of Commerce programs and ensure that where relevant, such programs further the conservation and enhancement of EFH, and that he coordinate with other Federal agencies to further the conservation and management of such habitat.[73]

4. Stakeholder Involvement

The SFA added new Council seats on the Mid-Atlantic and Pacific Councils to broaden council representation of specific perspectives.[74] The new seat on the Mid-Atlantic Council was a designated voting seat for North Carolina. Although it is geographically part of the South Atlantic Council, and it maintains its vote on that council, as a border state, North Carolina can be affected by the Mid-Atlantic Council's actions. The new seat on the Pacific Council was designated for a voting member from an Indian tribe with Federally recognized fishing rights.

The SFA also added new sections to the Magnuson-Stevens Act that relate to developing a better understanding of the various sectors of the fisheries and ensuring fairness and equity among those sectors.[75] Section 303(a)(13) requires FMPs to include a description of the commercial, recreational, and charter fishing sectors, and to quantify trends in landings by sector.[76] Section 303(a)(14) requires FMPs to allocate any necessary harvest restrictions and recovery benefits fairly and equitably among the sectors.[77]

5. Linkages: Communities, Capacity, Safety

a. Fishing Communities

Spurred by concerns that regulations and technology were threatening the viability of small, independent fishermen, and fishery dependent communities, Congress added the concept of "fishing communities" into the Magnuson-Stevens Act and established requirements that managers take communities into account.[78] New National Standard Eight requires that:

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72. *See id.* § 1855(b).
73. *See id.*
74. *See id.* § 1852(b).
75. *See id.* § 1853(a)(13), (14).
76. *See id.* § 1853(a)(13).
77. *See id.* § 1853(a)(14).
78. *See* 141 CONG. REC. H9116, 117 (1995) (statement of Rep. Young); 141 CONG.

> [c]onservation and management measures shall, consistent with the conservation requirements of this Chapter (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.[79]

The statute defines "fishing community" as "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and United States fish processors that are based in such community."[80] The SFA also changed the requirements for the analytical fishery impact statement that must accompany FMPs. Previous law required that FMPs include fishery impact statements describing the effects of management measures on fishery participants. The SFA added the requirement that fishery impact statements also consider the effects of management measures on fishing communities.

b. Capacity

In a fishery with excess capacity, the race for the fish takes priority over all other considerations. Considerations of the impacts of gear types, safety of life at sea, and the avoidance of bycatch are subjugated to the overriding concern of catching the most fish as quickly as possible. Thus, in ecosystem terms, the SFA's support for capacity reduction was a positive step towards making incentives more compatible with protective management. The SFA provided incentives for capacity reduction to facilitate efforts to match the fishing capacity of the fleet with productive capacity of the fishery. The SFA allows the Secretary, at the request of a council or governor, to conduct a fishing capacity reduction program if necessary to prevent overfishing, rebuild stocks, or "achieve measurable and significant improvements in the conservation and management of the fishery."[81] In addition, the SFA provided authorization for federal guarantees of industry-financed buyback programs.[82]

REC. H9116, 121 (1995) (statement of Rep. Saxton).

79. 16 U.S.C. § 1853(a)(8).

80. *Id.*

81. *Id.*

82. Sustainable Fisheries Act § 303, Pub. L 104-297 § 303, 110 Stat. 3559 (1996)

c. Safety

In keeping with the notion that an ecosystem approach would evaluate the downstream impacts of management measures, the SFA added a new national standard requiring the consideration of how management measures affect safe fishing practices. New National Standard Ten requires conservation and management measures to promote the safety of human life at sea.[83]

d. Optional Provisions

In addition to these new mandatory FMP provisions, the SFA also added additional optional provisions that Councils may include at their discretion. The new discretionary provisions specify that FMPs may limit the sale of fish, restrict transshipment, require more than one observer, include harvest incentives to encourage the reduction of bycatch, and reserve a portions of allowable biological catch for use in scientific research.[84] These provisions allow Councils to go beyond statutorily mandated minimum protections and undertake even more ecosystem-friendly approaches at their discretion.

IV. NMFS'S GUIDANCE ON IMPLEMENTING THE MAGNUSON-STEVENS ACT

NMFS has promulgated guidelines interpreting key provisions of the Magnuson-Stevens Act to provide guidance to councils.[85] The agency's interpretations go even further towards supporting ecosystem-based management than the statute does. The guidelines for calculating MSY and OY, identifying a management unit, accounting for variations and contingencies, and minimizing bycatch provide good examples of how NMFS encourages Councils to follow an ecosystem ethic.

A. Overfishing and Optimum Yield

National Standard One requires that FMPs achieve optimum yield while preventing overfishing,[86] and the Magnuson-Stevens Act provides

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(codified as amended at 42 U.S.C. § 1279(g) (1999 & Supp. IV 1998).

83. *See* 16 U.S.C.§ 1853(a)(10) (1994 & Supp. IV 1998).

84. *See id.* § 1853(b).

85. *See* 50 C.F.R.§ 600.

86. *See* 16 U.S.C. § 1851(a)(1) (1994 & Supp.1998).

basic definitions of both optimum yield from a fishery[87] and overfishing.[88] NMFS's guidelines provide more specific information on how to apply the concepts of OY and overfishing in the development of fishery management measures.[89] According to the statute, the definitions for OY and overfishing are both based on the concept of "maximum sustainable yield," (MSY),[90] a scientific calculation that has no statutory definition. NMFS's guidelines, however, define MSY as "the largest, long-term average catch that can be taken from a stock or stock complex under prevailing ecological or environmental conditions."[91] In providing guidance on calculating and using the concept of MSY, NMFS's guidelines rely on ecosystem concepts, such as factoring in uncertainties and erring on the side of conservation.

> Any MSY values used in determining OY will necessarily be estimates, and these will typically be associated with some level of uncertainty. Such estimates must be based on the best scientific information available . . . and *must incorporate appropriate consideration of risk.*[92]

The guidelines state that MSY should be re-estimated as required by changes in the environment or ecological conditions or new scientific information.[93]

Compliance with National Standard One's dual mandates of achieving optimum yield while preventing overfishing, requires the Councils (or the Secretary) to assess the status of the fish stocks and correlate that status to measurable criteria for determining whether the stock is overfished or overfishing is occurring. NMFS's guidelines provide additional instruction on how to determine whether overfishing is occurring, or a stock is approaching, or existing in, an overfished condition.[94] According to the guidelines, overfishing occurs when a stock is subjected to a rate or level of fishing mortality that jeopardizes the stock's long-term ability to produce MSY.[95] The term overfished can refer either to a stock that is being fished at too high a rate or level, or to a stock whose size is too small to support

87. *See id.* § 1802(26).
88. *See id.* § 1802(29).
89. *See* 50 C.F.R.§ 600.310(c)(2)(ii).
90. *See* 16 U.S.C. §§ 1802(28)(B),1802(29).
91. 50 C.F.R.§ 600.310(c)(1)(i).
92. *Id.* § 600.310(c)(2)(ii) (emphasis added).
93. *See id.* § 600.310(c)(iv).
94. *See id.* § 600.310.
95. *See id.* § 600.310(d)(1)(ii).

current effort (e.g., biomass too low).[96] To the extent possible, FMPs must specify objective and measurable criteria for determining whether stocks are meeting or approaching either type of overfishing situation, and councils must assess the stocks annually. The guidelines state that the criteria for determining stock status must include both maximum fishing mortality thresholds (upper limits on fishing) and minimum stock size thresholds (floors on the levels of biomass), or reasonable proxies for both.[97]

The guidelines promote the integration of ecosystem considerations into the development of the status determination criteria. For example, the guidelines state that "Councils *must* build into the status determination criteria appropriate consideration of risk, taking into account uncertainties in estimating harvest, stock conditions, life history parameters, or the effects of environmental factors."[98] In addition to these considerations that should go into the development of MSY, the guidelines promote additional consideration of ecosystem factors in setting OY and in developing overfishing criteria. For instance, the Magnuson-Stevens Act establishes certain values that must be considered in determining "optimum" yield: food production, recreational activities, and the protection of marine ecosystems.[99] The guidelines state that the benefits of protecting marine ecosystems include the benefits of "maintaining viable populations (including those of unexploited species), maintaining evolutionary and ecological processes (e.g., disturbance regimes, hydrological processes, nutrient cycles), maintaining the evolutionary potential of species and ecosystems, and accommodating human use."[100]

The Magnuson-Stevens Act provides that OY should be prescribed based on "MSY as reduced" by social, economic or ecological factors. The guidelines clarify that the ecological factors should include "the vulnerability of incidental or unregulated stocks in a mixed-stock fishery, predator-prey or competitive interactions, and dependence of marine mammals and birds or endangered species on a stock of fish."[101] The guidelines also state that the ecological considerations can include considerations of conditions that stress organisms, such as natural and manmade changes in wetlands or nursery grounds, and effects of pollutants on habitat and stocks.[102] The

96. *See id.*
97. *See id.*§ 600.310(d)(2).
98. *Id.* § 600.310(d)(3)(iii) (emphasis added).
99. *See* 16 U.S.C. § 1802(28) (1994 & Supp. IV 1998).
100. 50 C.F.R. § 600.310(f)(2)(iii) (1999).
101. *Id.* § 600.310(f)(3)(iii).
102. *See id.*

guidelines state that in setting OY, the Councils should adopt a "precautionary approach," which they describe as embodying three key features. First, "[t]arget reference points, such as OY, should be set safely below limit reference points." Second, a stock or complex that is below the level expected to produce MSY should be harvested at a lower rate than if it were above such a level. Third, the criteria used to set catch levels should be "explicitly risk averse," so that "greater uncertainty . . . corresponds to greater caution."[103] The guidelines also state that part of the OY may be held as a reserve to allow for uncertainties in factors such as stock size.[104]

B. Management Unit

National Standard Three requires that, to the extent practicable, FMPs manage interrelated stocks as a unit, and that individual stocks be managed as a "unit throughout their range."[105] When the range of the fishery overlaps Councils' jurisdictions, one FMP to cover the entire range is preferred.[106] The guidelines define "management unit" as "a fishery or that portion of a fishery identified in an FMP as relevant to the Council's management objectives," and the guidelines suggest that management units may be organized around a variety of perspectives.[107] The guidelines specifically contemplate FMPs that could be organized around ecological perspectives, stating that an FMP may be "based on species that are associated in the ecosystem or are dependent on a particular habitat."[108]

C. Information and Uncertainty

National Standard Six requires that FMPs take into account variations in and contingencies among fisheries.[109] NMFS's guidance on complying with National Standard Six promotes several key ecosystem management policies and principles: recognizing limited predictive ability and that ecosystems change; recognizing the interactions of multiple scales;

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103. *Id.* § 600.310(f)(5).

104. *See id.* § 600.310(f)(5)(iii).

105. *Id.* § 600.320.

106. *See id.* § 600.320(c).

107. *See id.* § 600.320(d).

108. *Id.* § 600.320(d)(vi). In fact, the Western Pacific Fishery Management Council is currently developing a Coral Reef Ecosystem Plan for the Northwest Hawaiian Islands. However, this authority is optional, not mandatory. *See* ENVIRONMENTAL IMPACT STATEMENT FROM THE PROPOSED CORAL REEF ECOSYSTEM FISHERY MANAGEMENT PLAN OF WESTERN PACIFIC REGION, 64 Fed. Reg. 32,210 (1999).

109. *See* 16 U.S.C. § 1851(a)(6) (1985 & Supp. 2000).

changing the burden of proof; applying the precautionary approach; and "purchasing insurance" against unforseen events. The guidelines state:

> [e]ach fishery exhibits unique uncertainties. The phrase 'conservation and management' implies the wise use of fishery resources through a management regime that includes some protection against these uncertainties.
>
> In fishery management terms, variations arise from biological, social, and economic occurrences, as well as from fishing practices. Biological uncertainties and lack of knowledge can hamper attempts to estimate stock size and strength, stock location in time and space, environmental/habitat changes, and ecological interactions. Economic uncertainty may involve changes in foreign or domestic market conditions, changes in operating costs, drifts towards overcapitalization, and economic perturbations caused by changed fishing patterns. Changes in fishing practices, such as the introduction of new gear, rapid increases or decreases in harvest effort, new fishing strategies, and the effects of new management techniques, may also create uncertainties. Social changes could involve increases or decreases in recreational fishing, or the movement of people into or out of fishing activities due to such factors as age or educational opportunities. . . .[110]

After describing some of the uncertainties that fishery managers should take into account, the guidelines explain how management measures should be more conservative when data are lacking.

> Every effort should be made to develop FMPs that discuss and take into account these vicissitudes. *To the extent practicable, FMPs should provide a suitable buffer in favor of conservation.* Allowances should be factored into the various elements of an FMP. Examples are:
>
> (i) *Reduce OY.* Lack of scientific knowledge about the condition of a stock(s) could be reason to reduce OY.
> (ii) *Establish a reserve.* Creation of a reserve may compensate for uncertainties in estimating domestic harvest, stock conditions, or environmental factors.

110. 50 C.F.R. § 600.335(b).

> (iii) *Adjust management techniques.* In the absence of adequate data . . . a Council could guard against producing drastic changes in fishing patterns, allocations, or practices.
> (iv) *Highlight habitat conditions.* FMPs may address the impact of pollution and the effects of wetland and estuarine degradation on stocks of fish; identify causes of pollution and habitat degradation . . .; propose recommendations to [appropriate authorities]; and state views of the Council on unresolved or anticipated issues.[111]

This guidance embodies the precautionary approach stressing that restrictions on harvest are acceptable and can be factored into the calculation of OY, and encouraging Councils to reach out to other agencies with management authority over related aspects of the marine ecosystems.[112] The guidelines recognize that the Councils are limited in their abilities to develop management measures for activities other than fishing, the guidance encourages them to work with other management agencies in issues relating to habitat/ecosystem. This section of the guidelines also encourages Councils to plan for "unpredictable events" by incorporating flexible management strategies into FMPs.[113]

D. Bycatch

National Standard Nine requires that, to the extent practicable, conservation and management measures minimize bycatch, and to the extent bycatch cannot be avoided, minimize the mortality of bycatch.[114] The statute defines bycatch as fish that are harvested, but not sold or kept for personal use, excluding fish released alive under a recreational catch and release program.[115] The guidelines expand this definition to clarify that bycatch also includes "fishing mortality due to an encounter with fishing gear that does not result in the capture of fish (i.e., unobserved fishing mortality)."[116]

The guidelines explain that bycatch can impede efforts to protect marine ecosystems in two ways: by increasing the uncertainty relating to the total fishing mortality, and by preempting other uses of fishery

111. *Id.* § 600.335(c) (emphasis added).
112. *See id.* § 600.350(d).
113. *Id.* § 600.335(d).
114. *See* 16 U.S.C. § 1851(a)(9) (1994).
115. *See id.* § 1802(2).
116. 50 C.F.R. § 600.350(c) (1999).

resources.[117] They state that the first priority under National Standard Nine is to avoid catching bycatch species where practicable. Then, to the extent bycatch cannot be avoided, species that are caught as bycatch "must, to the extent practicable, be returned to the sea alive."[118]

According to the guidelines, any conservation and management measure that does not give priority to the avoidance of bycatch must be based on an appropriate analysis considering: negative impacts on affected stocks; incomes to participants in both the directed fisheries that take the bycatch species, and other fisheries that target on the bycatch species; environmental consequences; non-market values of the bycatch species, including non-consumptive uses, existence values, and recreational values; and impacts on other marine organisms.[119]

The guidelines state that in determining whether management measures minimize bycatch to the extent practicable, the Councils should consider a wide variety of interconnected areas that could be affected, such as: population effects for the bycatch species; ecological effects on other species; changes in the bycatch of other species and related impacts of such changes; effects on marine mammals and birds; economic considerations; changes in fishing practices and fishermen's behavior; changes in the effectiveness of research, management, and enforcement measures; and changes in economic, social, cultural and nonconsumptive values of the fishery resources.[120] This wide-reaching list of considerations exemplifies good ecosystem-based management in that it encourages managers to look beyond the simple immediate effect of a change in one level of management and to consider the complex, related effects that are more difficult to quantify and assess.

V. ECOSYSTEM PRINCIPLES ADVISORY PANEL OBSERVATIONS

The Ecosystem Principles Advisory Panel, after completing its review of the extent to which ecosystem-based management is occurring in our fisheries, made several recommendations for improving ecosystem-based management. The Panel's recommendations related to three main areas: jurisdictional limitations, new management approaches, and information needs.

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117. *See id.* § 600.350(b).
118. *Id.* § 600.350(d).
119. *See id.*
120. *See id.* § 600.350(d)(3).

A. Jurisdiction

The Magnuson-Stevens Act establishes limited regulatory jurisdiction. It is a statute designed to regulate "fishing." The Panel noted that in many cases marine ecosystems are affected by activities beyond the jurisdiction of the Magnuson-Stevens Act, such as forestry, farming, resource extraction, and anchoring by non-fishing vessels.[121] The Magnuson-Stevens Act does require that, at least for EFH, the managers identify impacts from non-fishing sources, think about how to mitigate them, and work cooperatively with other management agencies to achieve the mitigation. The Panel suggests that this type of holistic consideration should be given to other areas besides EFH.[122]

B. Management Approaches

The panel recommended the use of two key management approaches: a new overarching planning mechanism they called a Fishery Ecosystem Plan (FEP), and reserved areas called Marine Protected Areas (MPAs). According to the Panel's suggestions, an FEP would (1) describe the physical, biological, and human components of the ecosystem to be managed, (2) direct how to use such information, and (3) set policies with management options.[123] An FEP might, for example, include "zoning" an ecosystem for various types of uses. Presumably, FMPs would then fall under the umbrella of a broader, more programmatic FEP. The MPA concept was less well-defined. The panel believed that MPAs could be developed in a variety of ways along a continuum of possible management regimes that would vary from more to less protective.[124] It is reasonable to assume that MPAs could range in scope from areas permanently closed to all fishing, to areas where gear types are prohibited or other less, sweeping protections are in place.

C. Information

The Panel identified several areas where additional information is needed to support a more ecosystem-oriented management regime. Recognizing an "urgent need for better understanding of ecosystem processes in general, and about the state and dynamics of specific ecosys-

121. ECOSYSTEM PRINCIPLES ADVISORY PANEL, *supra* note 5, at 23–24.
122. *See id.* at 30.
123. *See id.* at 27.
124. *See id.* at 29.

tems," the panel recommended a "substantial expansion of existing programs that collect data on trends and dynamics of marine ecosystems and which characterize the biological and physical relationships pertinent to ecosystem-based management."[125] Areas of focus could include monitoring of non-fish components of ecosystems; developing better understandings of food webs; and assessing the impacts of fishing in terms of effects on the genetic composition of the target stock, disturbances to food webs, and gear's alteration of habitat.[126]

The Panel also recommended research tailored to developing incentives for humans to become "prudent predators," including research into (1) social and economic importance of fisheries and other ecosystem uses, to improve understanding of motivations for behavior and facilitate development of incentives, (2) studies to identify factors that determine success or failure of governance systems, and (3) management experiments to test approaches for involving stakeholders in governance, making decisions when faced with multiple objectives, and considering differing societal perspectives across sectors.[127]

In addition to these new research agendas, the panel recommended a change in the current system of calculating total removals. The panel concluded that current management practices probably calculate total removals too low, and recommended that the measure of total removals should include fish, bycatch, predation, and fish caught and released in recreational fisheries with some determination of mortality rates for such fish.[128]

VI. How Effective Is the Magnuson-Stevens Act as an Ecosystem Management Tool?

Given this context, how well does our current statutory and regulatory framework provide for ecosystem management? To answer this question, we must assess how well the Magnuson-Stevens Act's treatment of key issues such as overfishing and OY, bycatch, habitat, stakeholder involvement, and linkages, provides for adhering to the principles and policies identified by the Ecosystem Advisory Panel. We must consider how the Magnuson-Stevens Act allows managers to recognize our limited under-

125. *Id.* at 34–35.

126. *See id.* at 24–25, 34–35.

127. *Id.* at 35–36.

128. *Id.* at 30. Although the Magnuson-Stevens Act's definition of bycatch does not include fish caught and released in recreational fisheries, the SFA, added a requirement to gather of more information on these fisheries. *See* Magnuson-Stevens Act § 303(a)(12).

standing of and ability to predict ecosystem functioning, promote diversity, apply the precautionary approach, recognize the complexity of interactions, and recognize that ecosystems are in flux.

Our current statutory treatment of overfishing and OY, particularly as interpreted through NMFS's guidelines, does account for uncertainty, and does provide opportunities for use of an ecosystem-based approach to a certain extent. The requirements ensure that OY may not be set higher than MSY. Managers may specify "optimum yield" in a manner that protects marine ecosystems, taking into account factors such as nutrient cycles, impacts on gene pools, and predator-prey relationships, and they may take conservative management strategies to guard against uncertainties. However, while managers must consider the protection of marine ecosystems in setting OY, they also must consider food production and recreational opportunities. Ultimately, it is up to the Councils or the Secretary to decide how to balance the competing considerations. Managers must specify measurable criteria for determining when overfishing is occurring, and then must take steps to prevent overfishing and rebuild overfished stocks. This must be done taking into account the impacts of management measures on a variety of interrelated variables such as impacts on fishing communities, and the safety of life at sea. NMFS's guidelines allow for incorporating uncertainty into the criteria and encourage, but do not require, the use of the precautionary approach.[129]

In dealing with the bycatch issue, the statute and the guidelines recognize the limited nature of our understanding of this issue and the complexities involved in manipulating bycatch. In the face of that limited understanding, the statute requires the gathering of data, and the avoidance of bycatch to the extent possible, thus creating a presumption against bycatch, shifting the burden of proof in favor of the resources.

In its treatment of habitat, the statute requires managers to identify essential fish habitat and minimize fishing impacts on such habitat. These requirements seem to challenge our limited understanding of and ability to predict ecosystem functioning. Some of the mandates on the Secretary and Councils to identify essential fish habitat aggressively push managers to make decisions based on very scarce data. However, to the extent that the

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129. The application of the precautionary approach and accounting for uncertainty in the development of fishery rebuilding plans is a tricky subject. In *Natural Resources Defense Council, Inc. v. Daley*, the summer flounder case, NMFS had approved a rebuilding plan that had an 18% chance of achieving its target. The court held that this was an unacceptably low probability of success, writing, "Only in Superman Comics' Bizarro world, where reality is turned upside down, could [NMFS] reasonably conclude that a measure that is at least four times as likely to fail as to succeed offers a 'fairly high level of confidence.'" Natural Resources Defense Council, Inc. v. Daley, 209 F.3d 747, 754 (D.C. Cir. 2000).

statute recognizes the significance of habitat and mandates the Secretary to minimize adverse impacts on that habitat, it comports with ecosystem management principles. In addition, to the extent that the EFH provisions take a broader look at impacts on EFH than just those caused by fishing, they comport with the ecosystem principle of recognizing linkages and facilitating cooperation with other agencies with jurisdiction over non-fishing activities that could be affecting fish habitat.

The law allows managers to define a management unit in ecosystem terms, and to provide economic incentives to reduce bycatch. However, the councils have significant discretion in defining the management unit. While they are permitted to define management units around an ecosystem perspective, they are also permitted to organize around other perspectives, such as geographic, economic, technical, and social.

While the Magnuson-Stevens Act requires managers to utilize the best available scientific information and requires the establishment of data gathering mechanisms for certain issues, such as bycatch, for other issues, such as overfishing and OY, it does not require the gathering of new data to resolve areas of uncertainty. Rather, it accepts uncertainty, and encourages the use of greater caution in the face of uncertainty. While this approach is consistent with the precautionary approach, true ecosystem management might very well require the gathering of new data, as recommended by the Ecosystem Principles Advisory Panel.

A repeated theme in this assessment of our ability to manage fisheries using an ecosystem-based approach has been the significant discretion allotted to the councils. The Magnuson-Stevens Act's council structure provides a unique opportunity in terms of federal resource management for true stakeholder involvement. The council system could be used to ensure a diverse group of perspectives are involved in fishery management decisions, and could be used to promote the development of incentives that are compatible with ecosystem goals. However, current council membership may omit certain view points that should be included in order to promote ecosystem-based management. Current law may allow for the appointment of a non-consumptive use perspective on the councils. Alternatively, Congress has demonstrated a willingness in the past to add voting seats to the councils in order to provide representation to an important interest group. Current membership composition should be evaluated to determine what additional perspectives should be represented in order to achieve ecosystem-based management.

In addition to the foregoing considerations, the Ecosystem Advisory Panel provided specific suggestions for how we could improve current efforts to implement ecosystem-based management. First, the panel identified the jurisdictional limitations of the Magnuson-Stevens Act as a

possible obstacle to ecosystem management. Not only do the councils have limited geographical jurisdictions which might not align with the parameters of an ecosystem, but in addition, NMFS lacks authority to regulate certain types of non-fishing activities that could affect marine ecosystems, such as anchoring, operating jet skis, dumping pollutants, and farming and forestry practices. The EFH provisions encourage interagency consultation to address non-fishing impacts on habitat, but the panel suggests such cooperation should be extended to other issues as well. New statutory authority or mandates could be required to achieve this level of integration and cooperation.

In addition, the panel suggested using two types of management measures, FEPs and MPAs. Both of these types of measures are already possible, and to some extent in use, under the Magnuson-Stevens Act.[130] However, one complicating factor in the development of FEP-type management regimes could in the end be the limited by geographic jurisdictions of the councils.

VII. CONCLUSION

It is evident that the Magnuson-Stevens Act provides opportunities for eco-minded managers to adopt ecosystem-based approaches. It even includes certain mandates that must be followed that promote ecosystem management and protection. However, in many cases there is no statutory mandate that the ecosystem-based approach be selected over other non-ecosystem-based approaches. Even after the enactment of the SFA amendments, the Magnuson-Stevens Act retains much of its focus as

130. Whether fish managers can, and are already, using FEPs and MPAs is really just a question of labeling. Conceivably, an FMP that defined its management unit as an ecosystem, would be an FEP. While for some ecosystems, FEP-type management might be complicated by the geography of Council jurisdictional lines, for other areas, it is possible. The Western Pacific Fishery Management Council is currently developing a Coral Reef Ecosystem Plan for the Northwest Hawaiian Islands. *See, e.g.*, 64 Fed. Reg. 32,210.

Likewise, with regard to the MPA concept, managers already utilize a broad range of protections that apply to certain marine areas, such as seasonal or year-round closures and gear restrictions. Because the panel conceived of MPAs as including areas subject to a wide variety of protections along a continuum of more and less protective, it would seem that anything ranging from an area where bottom trawling is restricted to a full-blown marine reserve, with full, year-round closures, and anchoring prohibitions would qualify as an MPA. The Western Pacific Fishery Management Council is specifically considering using MPAs in its Coral Reef Ecosystem Plan. *See* 64 C.F.R. 32210. In addition, the North Pacific Fishery Management Council has recommended establishing a marine reserve in the Sitka Pinnacles area for the purpose of habitat protection. *See* 65 C.F.R. 39342.

fishery resource statute focused on preserving the fishery as a commercial, nutritional, and recreational resource.

Yet, one thing the Magnuson-Stevens Act has demonstrated over the years, is its capacity to adapt and reflect our constantly evolving social mores. Morphing from the FCMA of the 1970s with the goals of ousting foreign fishing and building a domestic fleet, into the modern day Magnuson-Stevens Act which promotes fishing at sustainable levels and with consideration of ecosystem impacts, it has retained its fundamental structure whereby councils advance legislatively defined policies and standards. If public sentiment has evolved to the point of demanding ecosystem-based management of federal fisheries, the Magnuson-Stevens Act, with very little modification would provide a powerful tool for achieving that goal.